

## WHAT IS CLAIMED IS:

1. An expression vector comprising, in frame and in order, a pre sequence, a pro sequence, and a cloning site for in frame insertion of a catalytic domain cassette.

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2. The expression vector of claim 1, additionally comprising a tag sequence in frame with the cloning site.

3. The expression vector of claim 2 wherein said vector comprises a DNA sequence selected from the group consisting of SEQ.ID.NO.:1, SEQ.ID.NO.:2, SEQ.ID.NO.:3, SEQ.ID.NO.:4, SEQ.ID.NO.:5, and SEQ.ID.NO.:6.

4. The expression vector of claim 1, wherein said vector contains a catalytic domain cassette inserted in frame into the cloning site.

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5. A recombinant host cell containing the expression vector of claim 4.

6. A process for expression of a zymogen, comprising:

(a) transferring the expression vector of claim 4 into suitable host cells; and

20 (b) culturing the host cells of step (a) under conditions that allow expression of the zymogen expression vector.

7. The process of claim 6, wherein said expression vector comprises a nucleotide sequence selected from a group consisting of SEQ.ID.NO.:1, SEQ.ID.NO.:2,

25 SEQ.ID.NO.:3, SEQ.ID.NO.:4, SEQ.ID.NO.:5, SEQ.ID.NO.:6, SEQ.ID.NO.:7, SEQ.ID.NO.:8, SEQ.ID.NO.:9, SEQ.ID.NO.:10, SEQ.ID.NO.:59, and SEQ.ID.NO.:60.

8. A serine protease catalytic domain produced from a recombinant host cell containing the expression vector of claim 4, which functions as a serine protease when said protein is cleaved at the pre sequence.
- 5 9. A serine protease catalytic domain produced from a recombinant host cell containing the expression vector of claim 8 wherein the amino acid sequence is selected from a group consisting of SEQ.ID.NO.:11, SEQ.ID.NO.:12, SEQ.ID.NO.:13, SEQ.ID.NO.:14, SEQ.ID.NO.:53, SEQ.ID.NO.:54, and functional derivatives thereof.
- 10 10. The protease of claim 8, wherein said protease is bound to Ni-NTA silica or Ni-NTA agarose beads.
11. A method for identifying compounds that modulate the activity of a protease expressed from the expression vector of claim 4, comprising:
  - (a) combining a modulator of protease activity, protease protein, and a labeled substrate; and
  - (b) measuring a change in the labeled substrate.
- 15 12. The method of claim 11 wherein the labeled substrate is selected from the group consisting of fluorogenic, colormetric, radiometric, and fluorescent resonance energy transfer (FRET).
- 20 13. A compound active in the method of Claim 11, wherein said compound is a modulator of a serine protease catalytic domain.
- 25 14. A compound active in the method of Claim 11, wherein the effect of the modulator on the protease is inhibiting or enhancing its enzymatic activity.

15. A compound active in the method of Claim 11, wherein the effect of the modulator on the protease is stimulation or inhibition of proteolysis mediated by the expressed catalytic domain.

5 16. A pharmaceutical composition comprising a compound of Claim 13.

17. A pharmaceutical composition comprising a compound of Claim 13, wherein said compound is a modulator of a protease selected from the group consisting of SEQ.ID.NO.11, SEQ.ID.NO.12, SEQ.ID.NO.13, SEQ.ID.NO.14, SEQ.ID.NO.53, 10 SEQ.ID.NO.54, and functional derivatives thereof.

18. A method of treating a patient in need of such treatment for a condition that is mediated by a protease, comprising administration of the compound of Claim 13.

15 19. A kit comprising the expression vector selected from a group consisting of the expression vector of claim 1, the expression vector of claim 4, and functional derivatives thereof.

20 20. A kit comprising the nucleic acid sequence selected from the group consisting of, 20 SEQ.ID.NO.:1, SEQ.ID.NO.:2, SEQ.ID.NO.:3, SEQ.ID.NO.:4, SEQ.ID.NO.:5, SEQ.ID.NO.:6, SEQ.ID.NO.:7, SEQ.ID.NO.:8, SEQ.ID.NO.:9, SEQ.ID.NO.:10, SEQ.ID.NO.:59, SEQ.ID.NO.:60 and fragments thereof.

21. A kit comprising a serine protease protein selected from the group consisting of, 25 SEQ.ID.NO.:11, SEQ.ID.NO.:12, SEQ.ID.NO.:13, SEQ.ID.NO.:14, SEQ.ID.NO.:53, and SEQ.ID.NO.:54.

22. A pharmaceutical composition comprising the serine protease catalytic domain of claim 9.

23. The pharmaceutical composition of claim 24 wherein said composition is a topical skin care composition.

5 24. A non-pharmaceutical composition comprising the serine protease catalytic domain of claim 9.

10 25. The non-pharmaceutical composition of claim 23 wherein the composition is selected from the group consisting of a laundry detergent, shampoo, hard surface cleaning compositions, and dish-care cleaning compositions.

15 26. A method of treating, either prophylactically or acutely, an imbalance of desquamation comprising topical application of the composition of claim 23.